N° 210 A.D. 1910

(*Under International Convention.*)

Date claimed for Patent under Patents and Designs Act, 1907, being date of first Foreign Application (in Germany), } *5th Jan., 1909*

Date of Application (in the United Kingdom), 4th Jan., 1910

At the expiration of twelve months from the date of the first Foreign Application, the provision of Section 91 (3) (a) of the Patents and Designs Act, 1907, as to inspection of Specification, became operative

Accepted, 29th Sept., 1910.

COMPLETE SPECIFICATION.

Improvements in Flying-machines.

I, Dr. Fritz Huth, of Böhmischestrasse 46, Rixdorf, in the German Empire, Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to flying-machines, and more particularly to the design and frame work of the bearing planes and to the means for steering and preserving equilibrium, all of which will be described with reference to the annexed drawings, and set forth in the subjoined claims.

Primarily the invention consists in constructing the aeroplane of a series of overlapping annular frame-parts, which may be uniform or nearly uniform, with the planes stretched in the spaces between said frame-parts, where they overlap. These frames may be circular, elliptical or polygonal. No general claim is made to annular arrangement of planes about an aperture. The invention also comprises, in combination with this feature, improved means for collective steering and adjustment of bearing planes, no general claim being made to collective control.

Figure 1 shows a construction wherein circular overlapping frames are used for the bearing planes. The spaces traversed by horizontal lines between the frames *a* and *b* represent the bearing planes.

Figure 2 shows this construction applied to a tri-plane.

Figure 3 (plan and elevation) shows a construction with polygonal frames *a* and *b*.

In this case also the shape of the frame is such that the bearing planes have at all parts as nearly as possible equal depth in the direction of flight. The bearing planes are either all perpendicular one above the other, or are staggered like the upper ones in Figure 2.

The propeller screws can with advantage be centrally arranged in the space surrounded by the bearing planes. Figure 2 shows three propellers, of which that at the centre also serves as flywheel of the motor. If several motors are used, the propellers are connected to each other so that symmetrical drive continues in case one motor stops.

[*Price* 8*d.*]

Since the centre of gravity of the flier is in the space surrounded by the bearing planes, beating or flapping wings may be used without risk of unfavourably influencing the stability of the machine.

The shape of the flying-machine is well adapted for applying propulsion to the ground-wheels, for example by means of a half-crossed belt. During flight the belt can be shifted on to an idle pulley. By direct propulsion of the ground-wheels in this manner the attainment of the velocity requisite for ascent is facilitated.

Vertical steering may be effected by deflecting the front bearing planes, and preferably also those at the rear, in the opposite direction. The inclination of the forward planes is increased, and that of the rearward planes reduced, or *vice versa*. The steering effects of the fore and aft planes are thus added together. Rotation about the axis of flight is effected by deflecting the right-hand and left-hand planes in opposite directions. If, for example, the machine is inclining towards the right, owing to the effect of wind, the plane-parts v_r and h_r (Figure 1) are lowered and the parts v_1 and h_1 raised. By this means the lifting power is increased on the right-hand side, and the machine is righted. No general claim is made to an annular arrangement of planes, portions of which are independently and collectively adjustable at different angles, at the front, rear and sides. The torque due to increased resistance on the right-hand side is neutralised by means of the ordinary rudder or by means of movable planes specially provided for that purpose. This neutralisation is preferably automatically effected in positive relation with the stability of the machine.

An example of means for this purpose is shown in Figure 4, in which h_1, h_r, v_r and v_1 are cranks from which wires or the like (not shown) lead to the correspondingly marked parts in Figure 1. If the steering wheel H is lifted without being turned, the bevel-wheels k_1 and k_r are rotated in the same direction by the bevel wheel k; h_1 and h_r are lowered, and v_r and v_1 raised. This movement of the handwheel therefore produces a rotation of the flying machine about its horizontal transverse axis, and consequently a change of altitude.

If on the other hand the hand-wheel remains stationary but is rotated for example to the right, the bevel-wheel k rotates the wheels k_r and k_1 in opposite directions, v_1 and k_1 are lowered, and h_r and v_r raised. The left-hand bearing planes therefore become more inclined, and the right-hand planes more horizontal, and the machine rotates to the right about its axis of flight, *i.e.* in the same direction as the steering wheel. To avoid increase of air-resistance on the left-hand side, and consequent lateral deflection of the machine, the steering wires s_1 and s_r leading to the vertical rudder and connected to an arm on the steering shaft are moved by one rotation of the hand-wheel. In the case just considered s_r is pulled, and the rudder is moved to the right.

Deflection of the machine to the left or right is effected by moving the hand-wheel and steering shaft to the right or left. For this purpose the entire steering gear is rotatable about the pillar g. The interference with the adjustment of the planes, by rotation of the pillar, is negligible.

Preferably the steering members are automatically adjusted for straight flight, by spring-power or the like, when the steering effort is relaxed, or at least the normal position is indicated.

It is also advisable to make the relative inclination of the propeller axes and bearing planes adjustable so that the angle of flight corresponding to the normal position of the rudder can be adjusted for different speeds.

Another form of steering gear is shown in Figure 5. In this case the planes are connected by wires to an arm A on the steering shaft, so that said planes are symmetrically adjusted for altitude by raising and lowering the shaft, and by this means lowering or raising the rear edge of the plane; Figure 5 shows two of the wires, arranged for lifting the rear edge of the plane. By rotating the shaft, one tip is raised and the other lowered, the rudder being at the same time actuated by wires s_r and s_1. By rocking the shaft in a horizontal plane in

slot *f*, the rudder is actuated without appreciably altering the adjustment of the planes.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A flying machine with a series of overlapping annular bearing plane frames, and planes stretched in the spaces between said frames where they overlap.

2. A flying machine as set forth in Claim 1, wherein portions of the planes symmetrical to the axis of flight are adjustable so that the altitude and inclination of the machine can be altered by adjusting said planes.

3. A flying machine as set forth in Claim 1, wherein the bearing planes fore and aft of the horizontal transverse axis are adjustable at will.

4. A flying machine as set forth in Claims 1 to 3, wherein fore and aft lateral plane-parts are connected to cranks on two bevel-wheels which face each other and mesh with a third bevel-wheel fixed to a steering shaft to which a rudder is connected so that said rudder is actuable by rotating said shaft and by rocking the same.

5. A flying machine as set forth in Claims 1 to 3 wherein bearing planes are connected to a steering shaft so that they are symmetrically adjusted by rocking said shaft in a vertical plane, and symmetrically adjusted by rotating said shaft, the rudder being connected to the shaft so that it is operated collectively with the planes by rotating the shaft, and independently of the planes by rocking the shaft in a horizontal plane.

Dated this 4th day of January, 1910.

HERBERT HADDAN & Co.,
Agents for Applicant,
31 & 32, Bedford Street, Strand, W.C., London.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1910.

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1.

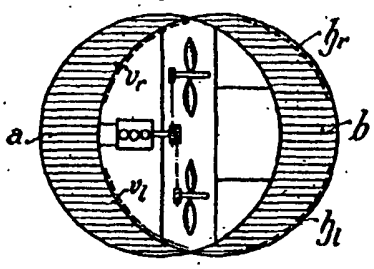

Fig. 2.

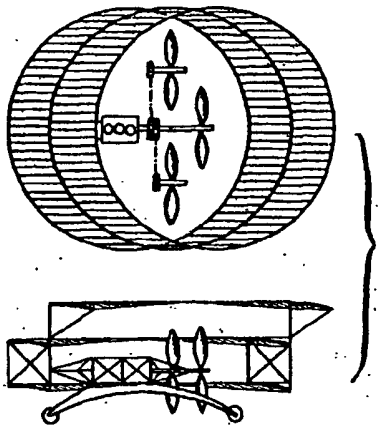

Fig. 3.

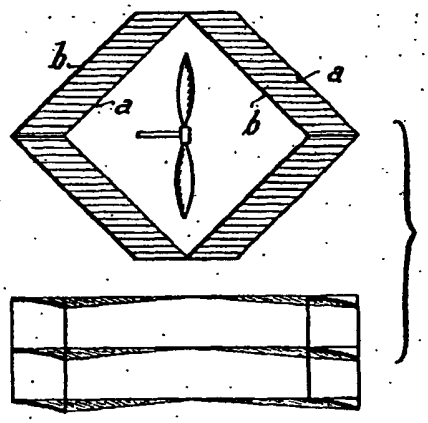

Fig. 4.

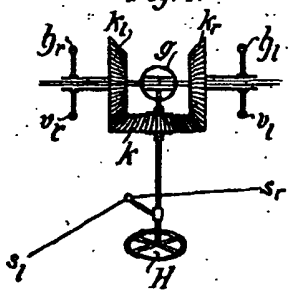

Fig. 5.